Geometrical and numerical methods to study Markov-perfect Nash equilibria of differential games

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Abstract:

The determination of Markov-perfect Nash equilibria in differential games with infinite time horizons gives rise to a system of coupled implicit nonlinear differential equations: the stationary Hamilton-Jacobi equations of the game. If the state space is one-dimensional, these are ordinary differential equations. Geometrical methods can then be brought to bear, with which a number of properties of the Nash equilibrium strategies can be established. For general state spaces, Nash strategies can be computed by integrating the time-dependent partial differential Hamilton-Jacobi equations until a stationary solution is reached. As an application, the computation of a non-symmetric Markov-perfect Nash equilibrium is discussed.